



Forum IMK



The forgotten TKA : Myth or Reality ?

Sébastien LUSTIG MD, PhD, Prof *

**Centre Albert Trillat*

Hospices Civils de Lyon - Lyon, France

Charles Rivière
Elvire Servien
Philippe Neyret



Conflicts of interest

- ***Consultant :***

Heraeus

Tornier

Amplitude

Lepine

Smith and Nephew

- ***Scientific societies:***

ISAKOS : Deputy Chair Arthroplasty
Committee

EKS : Travelling fellowship
Committee

- ***Editorial board:***

KSSTA

OTSR

Maitrise Orthopédique

Daily Activities and « Residual Pain »

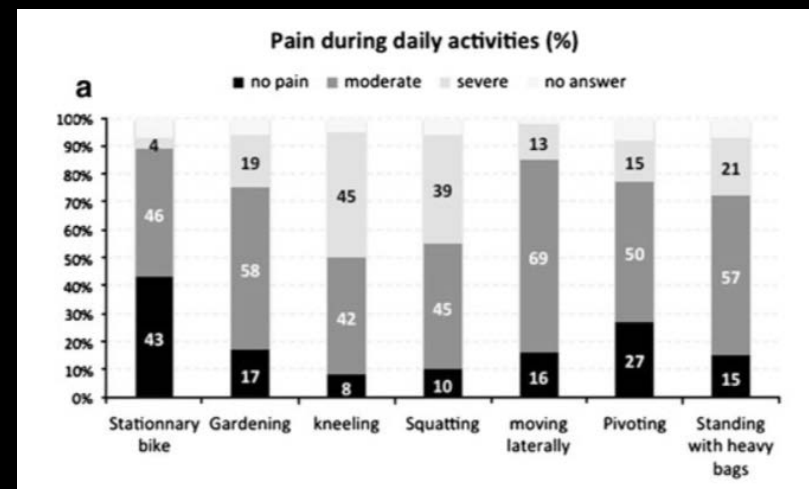
- Multicenter study
 - Non selected 347 TKA
- 90 points satisfied vs 70 dissatisfied ($p < 0.001$)
- 60% pain free
 - rest in bed
 - walking and sitting
- 8-43% pain free
 - daily activities

Knee Surg Sports Traumatol Arthrosc (2011) 19:1411–1417
DOI 10.1007/s00167-011-1549-2

KNEE

What are the factors of residual pain after uncomplicated TKA?

Michel P. Bonnin · Luca Basigliani ·
H. A. Pooler Archbold



Pain after TKA

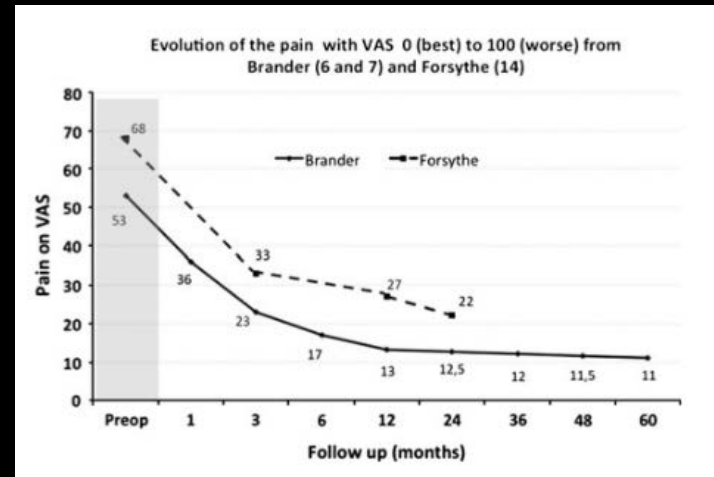
- Factors influencing satisfaction :
 - Function and pain expectation
- Risk factors for pain :
 - Female and age < 60
 - Psychological profile
- Natural history of pain :
 - Might improve for 1 year

Knee Surg Sports Traumatol Arthrosc (2011) 19:1411–1417
DOI 10.1007/s00167-011-1549-2

KNEE

What are the factors of residual pain after uncomplicated TKA?

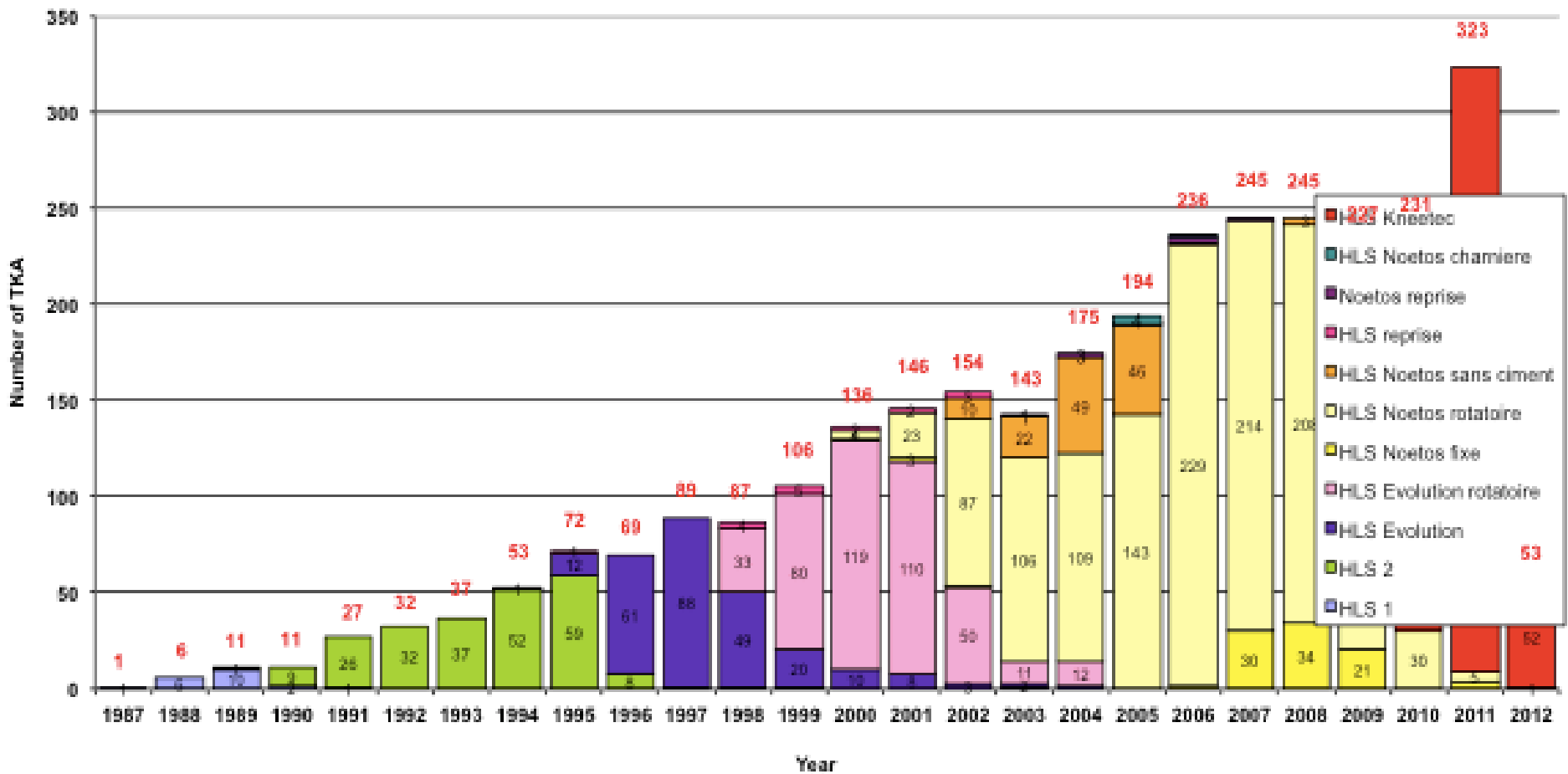
Michel P. Bonnin · Luca Basiglini ·
H. A. Pooler Archbold



Key Points

1. Our experience
2. Implants, design and Kinematic
3. Surgical technique
4. Multimodal Pain Management
5. Rehab
6. Patient's role

$n = 4014$



Our experience



IKS Knee score = 100
16 %

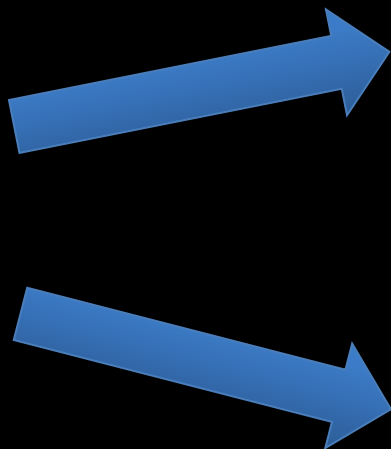
No pain
48 %

n = 2285
(Min 2 ans de recul)

Our experience



n = 930
(Min 2 ans de recul)



IKS Knee score = 100
30 %

No pain
42 %

Forgotten Joint Score

Good validity and reliability of the forgotten joint score in evaluating the outcome of total knee arthroplasty

A retrospective cross-sectional survey-based study

Morten G THOMSEN¹, Roshan LATIFI¹, Thomas KALLEMOSE^{1,2}, Kristoffer W BARFOD¹, Henrik HUSTED¹, and Anders TROELSEN¹

¹ Department of Orthopedic Surgery and ² Clinical Research Center, Copenhagen
Correspondence: morten@grovethomsen.dk
Submitted 2015-08-19. Accepted 2015-12-17.

- Are you aware of your artificial knee ...
- 1 ... in bed at night?
 - 2 ... when sitting on a chair for more than one hour?
 - 3 ... when you are walking for more than 15 minutes?
 - 4 ... when taking a bath/shower?
 - 5 ... when traveling in a car?
 - 6 ... when climbing stairs?
 - 7 ... when walking on uneven ground?
 - 8 ... when standing up from a low-sitting position?
 - 9 ... when standing for long periods of time?
 - 10 ... when doing housework or gardening?
 - 11 ... when taking a walk or hiking?
 - 12 ... when doing your favorite sport?

Key Points

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Gait Analysis

Do we restore normal kinematics with current design of TKA ?

The KneeKG system: a review of the literature

Sébastien Lustig · Robert A. Magnusson ·
Laurence Cheze · Philippe Neyret



n=20 (age-matched)



n=20

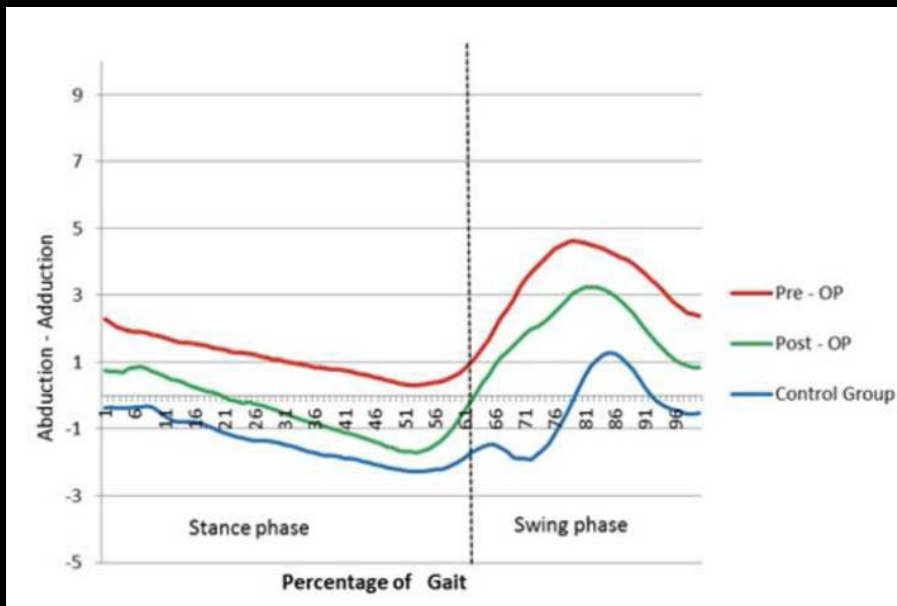


n=20 (1y FU)

Bytyqi, Neyret, Lustig.

Archive Orth. Trauma. Surg. – 2017 (*In press*)

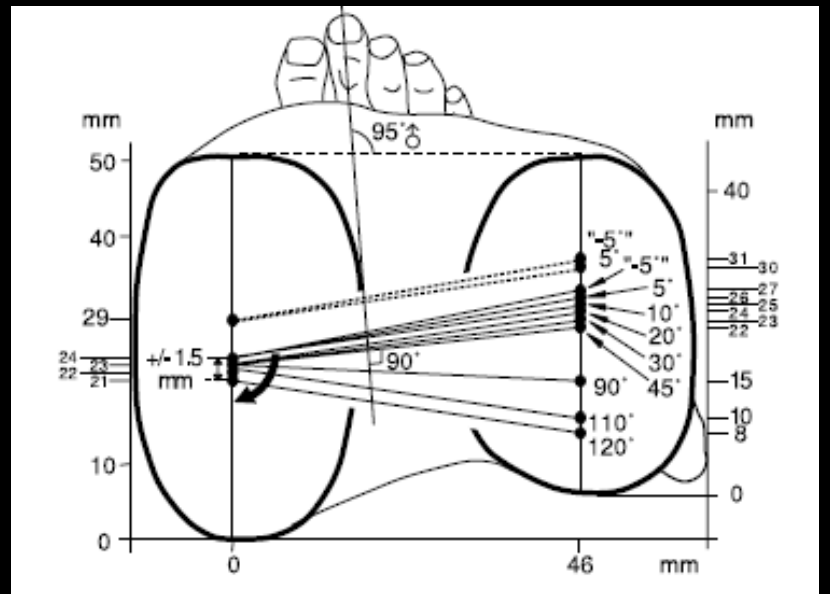
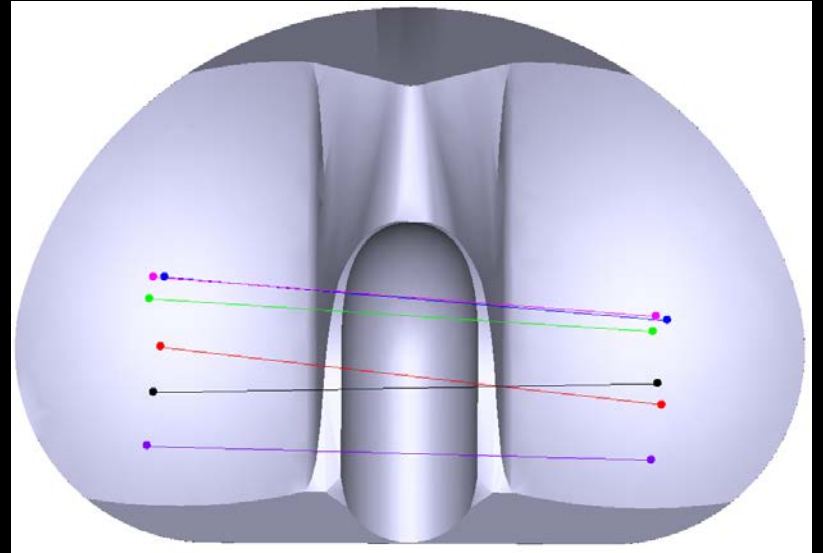
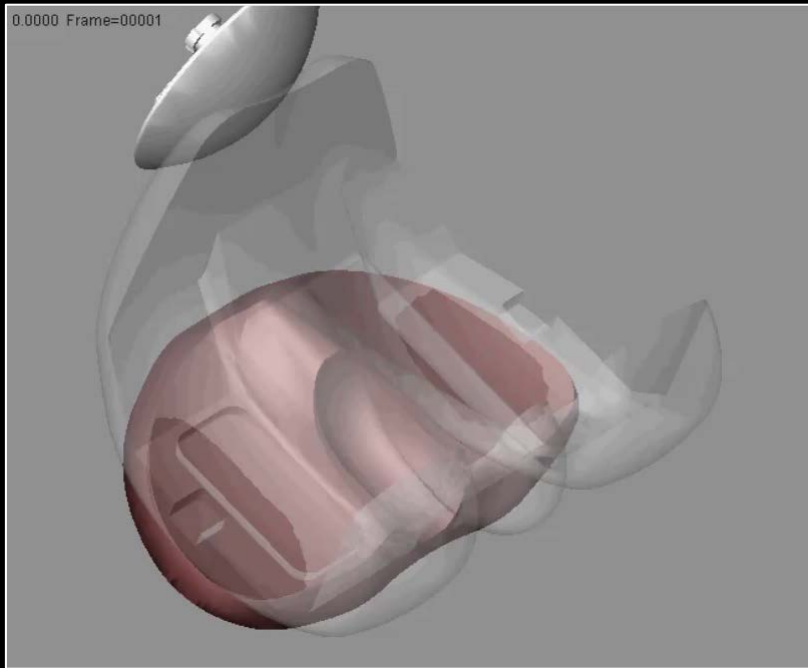
Does a 3rd Condyle TKA Restore Normal Gait Kinematics in Varus Knees? In Vivo Knee Kinematic Analysis



lower range
of axial rotation

Despite improvements, the knee kinematics during gait in TKA group differed from healthy control group.

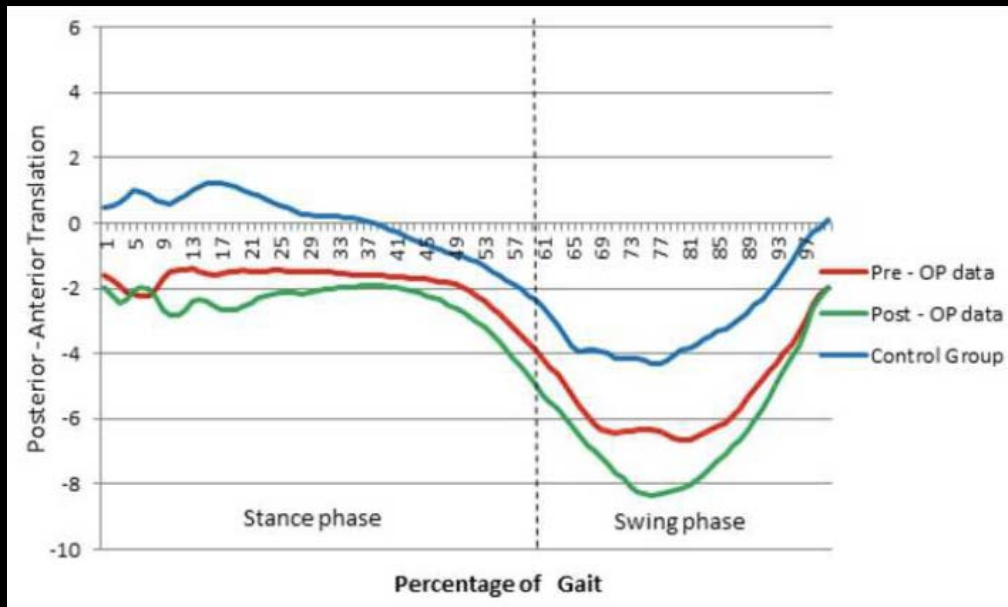
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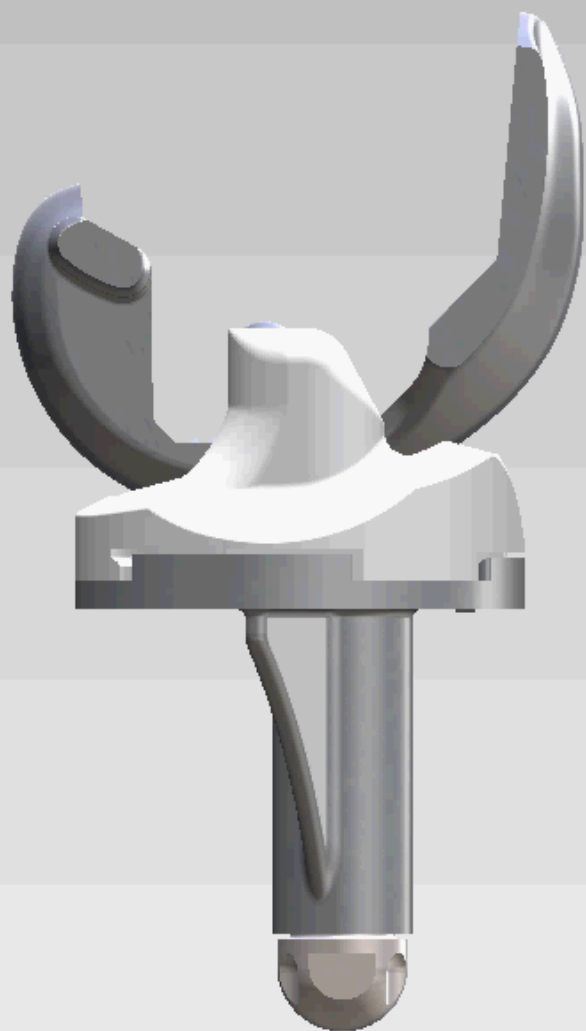
Bytyqi, Neyret, Lustig.

Archive Orth. Trauma. Surg. – 2017 (*In press*)

Does a 3rd Condyle TKA Restore Normal Gait Kinematics in Varus Knees? In Vivo Knee Kinematic Analysis



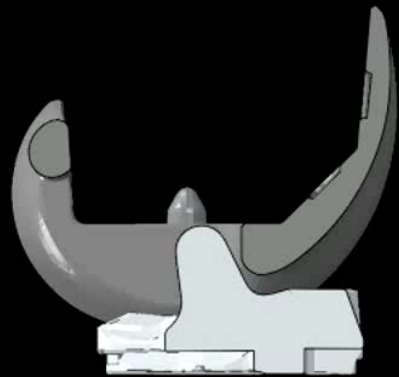
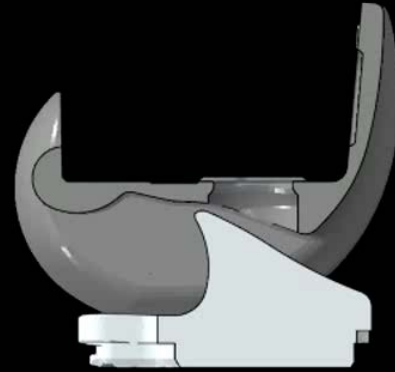
increased
tibial posterior
displacement



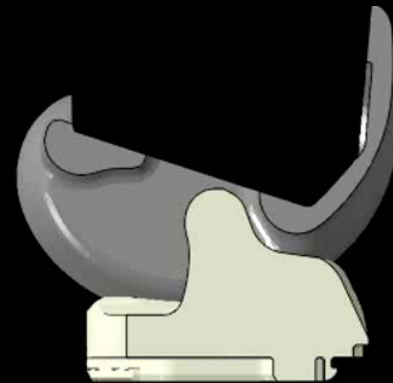
ATTUNE™
PS FB System



SIGMA®
PS FB System



NexGen®
PS FB System



Triathlon®
PS FB System

Our experience

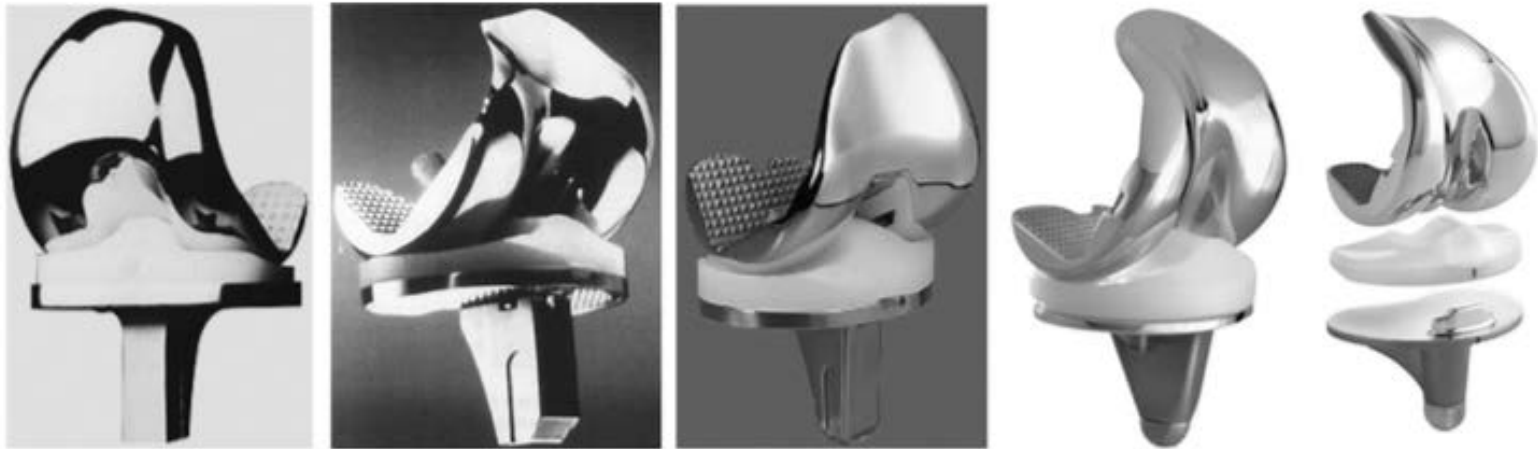


Fig. 2. Successive generations of the HLS implant (from left to right: HLS1[®], HLS2[®], HLS Evolution[®], HLS Noetos[®], and HLS KneeTec[®]).



Available online at
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www.em-consulte.com/en



n = 4014

Original article

Total knee implant posterior stabilised by a third condyle: Design evolution and post-operative complications

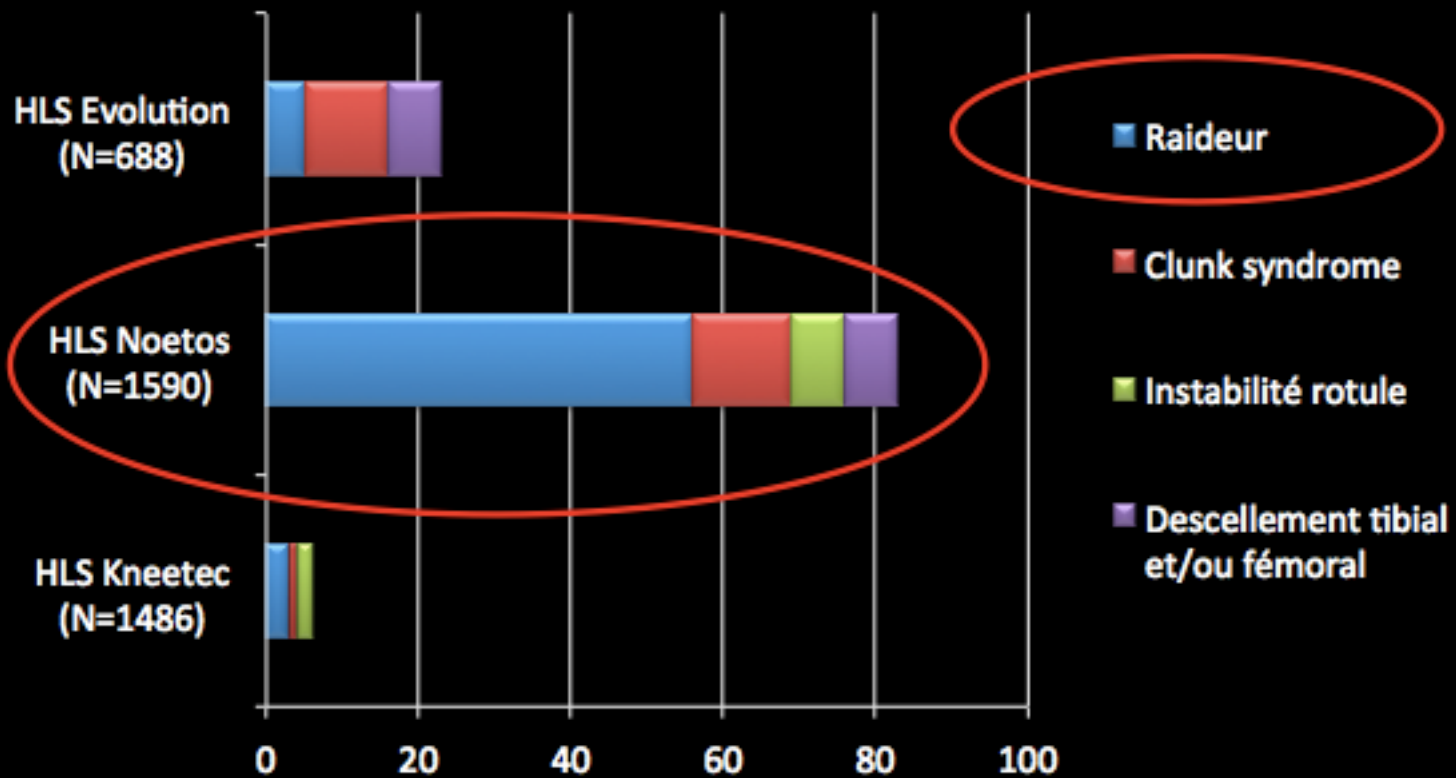
R. Gaillard, S. Lustig*, A. Peltier, V. Villa, E. Servien, P. Neyret

Service d'orthopédie, Albert-Trillat Center, hôpital de la Croix-Rousse, 103, grande rue de la Croix-Rousse, 69004 Lyon, France



4014 consecutive

3rd condyle TKA





Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-013-2443-x

KNEE

Mediolateral oversizing influences pain, function, and flexion after TKA

Michel P. Bonnin · Axel Schmidt · Luca Basiglini ·
Nadine Bossard · Emmanuelle Dantony

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Overhang of the Femoral Component in Total Knee Arthroplasty: Risk Factors and Clinical Consequences

By Ormonde M. Mahoney, MD, and Tracy Kinsey, MSPH

Investigation performed at the Athens Orthopedic Clinic, Athens, Georgia



18
Ant. from
DVM



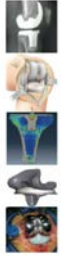
Key Points

1. Our experience
2. Implants, design and Kinematic
3. Surgical technique
4. Multimodal Pain Management
5. Rehab
6. Patient's role



Cahiers d'enseignement de la SOFOT
Collection dirigée par Sébastien Parratte

Prothèses totales de genou



Coordination :
Sébastien Lustig
Sébastien Parratte

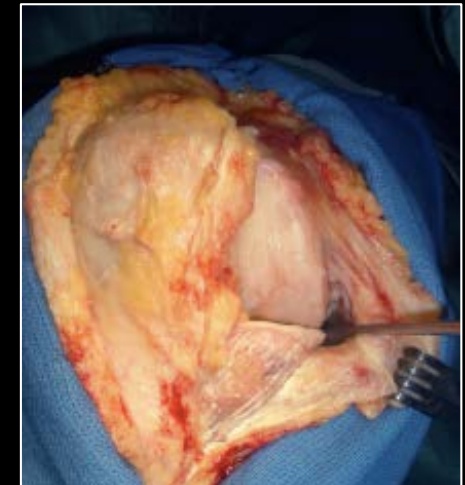
ELSEVIER

Elsevier Masson

Surgical approach

Voies d'abord mini-midvastus–mini-subvastus, voies d'abord latérales–tubérosité tibiale antérieure

J. CHOUTEAU



Clin Orthop Relat Res (2013) 471:46–55
DOI 10.1007/s11999-012-2486-1

Clinical Orthopaedics
and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

SYMPOSIUM: PAPERS PRESENTED AT THE ANNUAL MEETINGS OF THE KNEE SOCIETY

The John Insall Award

No Benefit of Minimally Invasive TKA on Gait and Strength Outcomes
A Randomized Controlled Trial

Julien Wegrzyn MD, PhD, Sébastien Parratte MD, PhD,
Krista Coleman-Wood PhD, PT, Kenton R. Kaufman PhD, PE,
Mark W. Pagnano MD

Ligament balancing

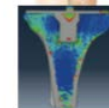
Alignement dans les prothèses totales de genou

M. ABDEL, S. OUSSEDIK, C. RIVIERE, M. OLLIVIER



Cahiers d'enseignement de la SOFCOT
Collection dirigée par Denis Huten

Prothèses totales de genou

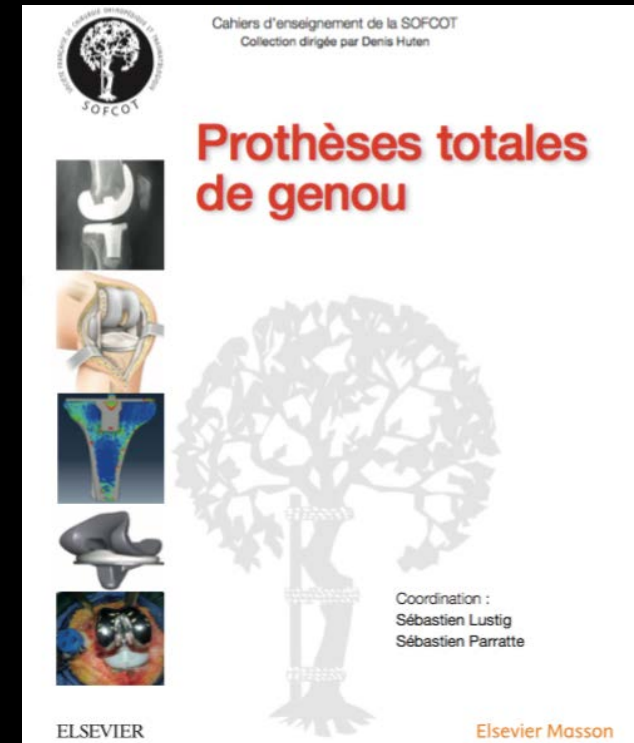
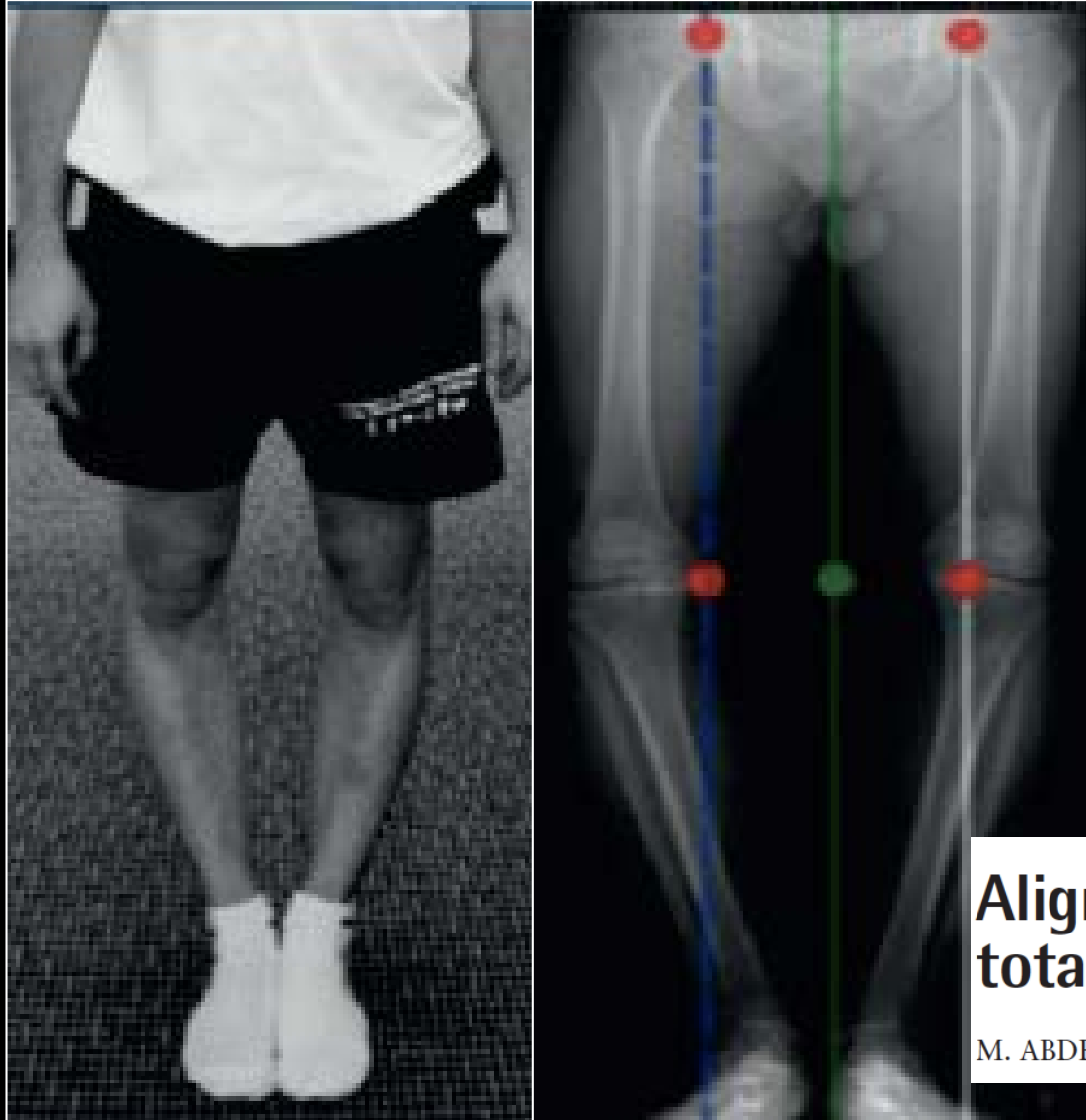


Coordination :
Sébastien Lustig
Sébastien Parratte

ELSEVIER

Elsevier Masson

Constitutional alignment



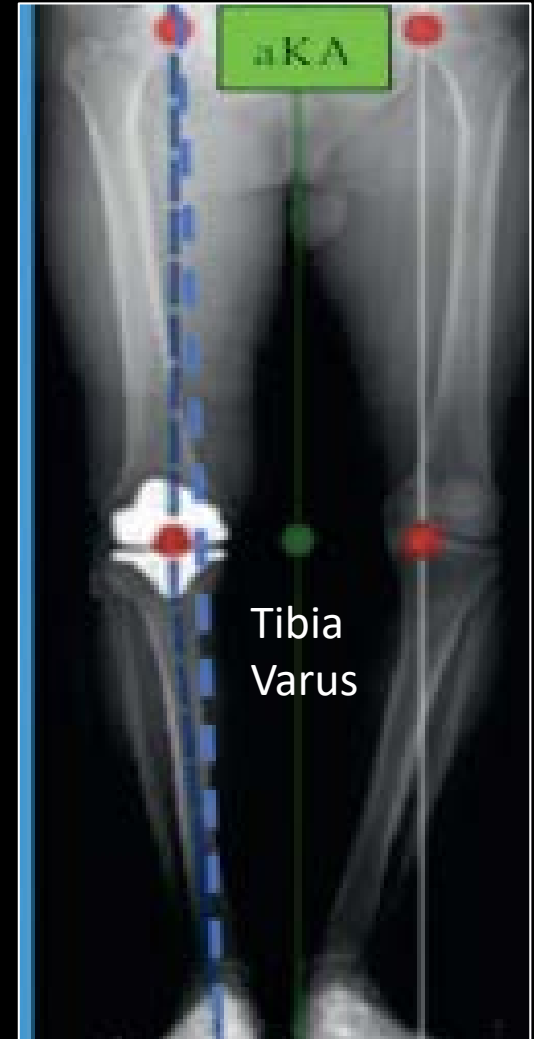
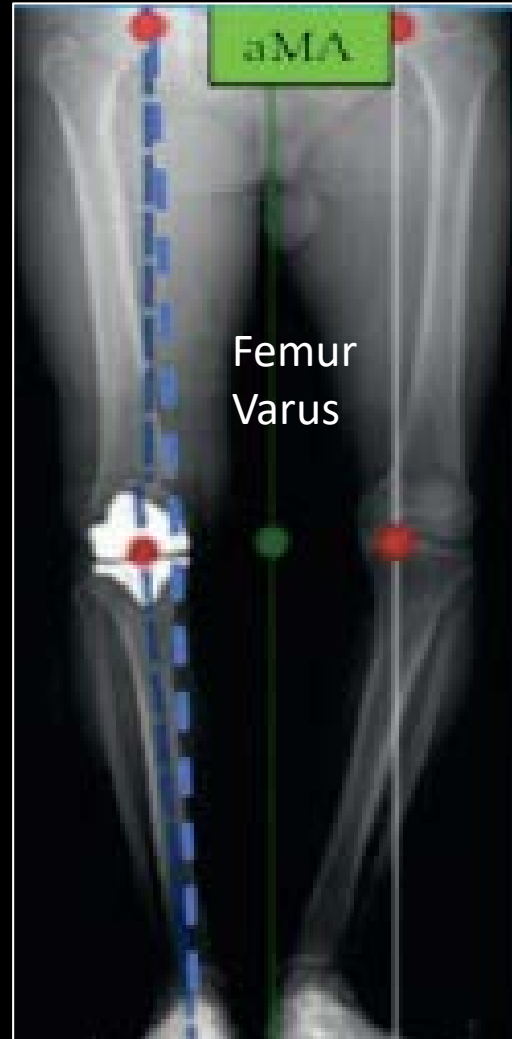
Alignement dans les prothèses totales de genou

M. ABDEL, S. OUSSEDIK, C. RIVIERE, M. OLLIVIER

« SYSTEMATIC » ALIGNMENT



« HYBRID » ALIGNMENT

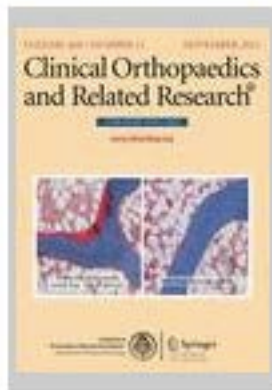


Functional assessment

Residual varus deformity does not negatively influence results of total knee arthroplasty in patients with pre-operative varus deformity

CLINICAL ORTHOPAEDICS AND RELATED RESEARCH®

DOI: 10.1007/s11999-011-1988-6 **Online First**



CLINICAL RESEARCH

Residual Varus Alignment does not Compromise Results of TKAs in Patients with Preoperative Varus

Robert A. Magnussen, Florent Weppe, Guillaume Demey, Elvire Servien and Sébastien Lustig

A Publication of

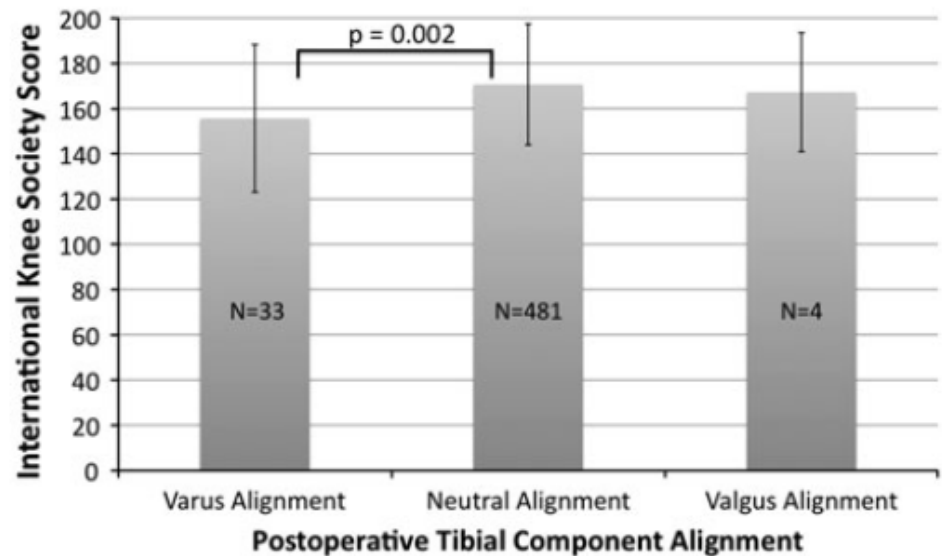


The Association of Bone and Joint Surgeons®

Residual Varus Alignment does not Compromise Results of TKAs in Patients with Preoperative Varus

Robert A. Magnussen MD, Florent Weppe MD,
Guillaume Demey MD, Elvire Servien MD, PhD,
Sébastien Lustig MD, PhD

Avoid post op
tibial varus
alignment



KINEMATIC ALIGNMENT



The goal ?

Normal knee



Arthritic Knee



Homeostasis

Homeostasy for Total knee arthroplasty

Bony Anatomy



Muscle
strength

Implant

Soft tissues

Bone quality

AIX-MARSEILLE UNIVERSITÉ

THÈSE

pour obtenir le grade de

DOCTEUR de Aix-Marseille Université

École Doctorale Science du Mouvement Humain

présentée et soutenue publiquement
par

Dr Charles RIVIÈRE

le 15 Décembre 2016

KINEMATIC ALIGNMENT TECHNIQUE FOR TOTAL KNEE REPLACEMENT: RATIONAL, CURRENT EVIDENCE, POTENTIAL CONCERNS

Directeur de thèse: Patrick CHABRAND

Co-directeur de thèse: Sébastien PARRATTE

Jury

M. le Professeur Justin COBB,	Président
M. le Professeur Thierry JUDET,	Rapporteur
M. le Professeur Sébastien LUSTIG,	Rapporteur
M. le Professeur Jean-Noël ARGENSON,	Examinateur
M. le Professeur Patrick CHABRAND,	Directeur de thèse
M. le Professeur Sébastien PARRATTE,	Co-directeur de thèse

Microsoft Document Connection

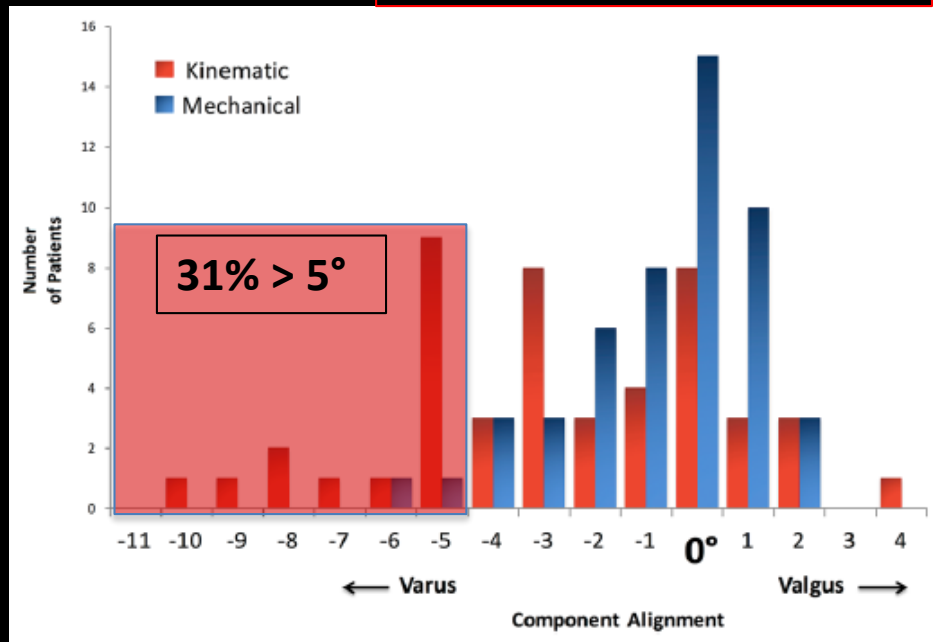
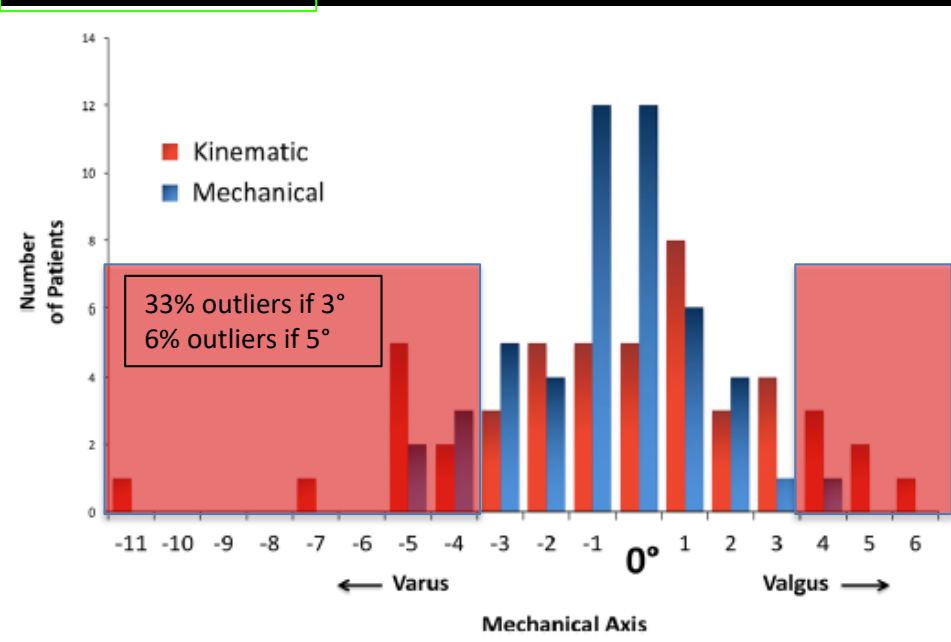
Concerns with KA technique

- **Severe patho-anatomy:**
 - Severe constitutional varus/valgus
 - Severe JL obliquity

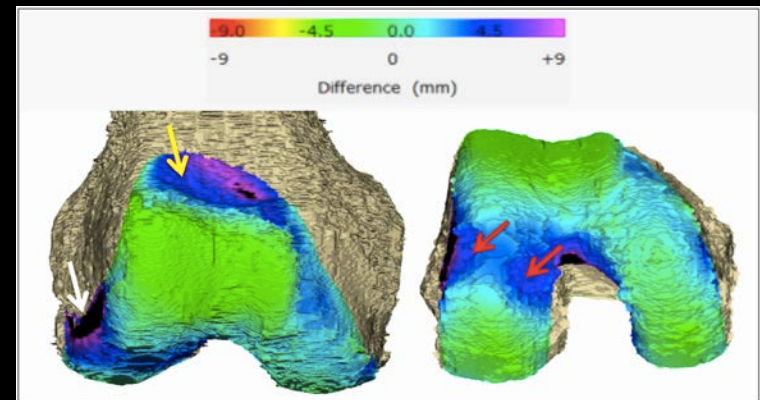
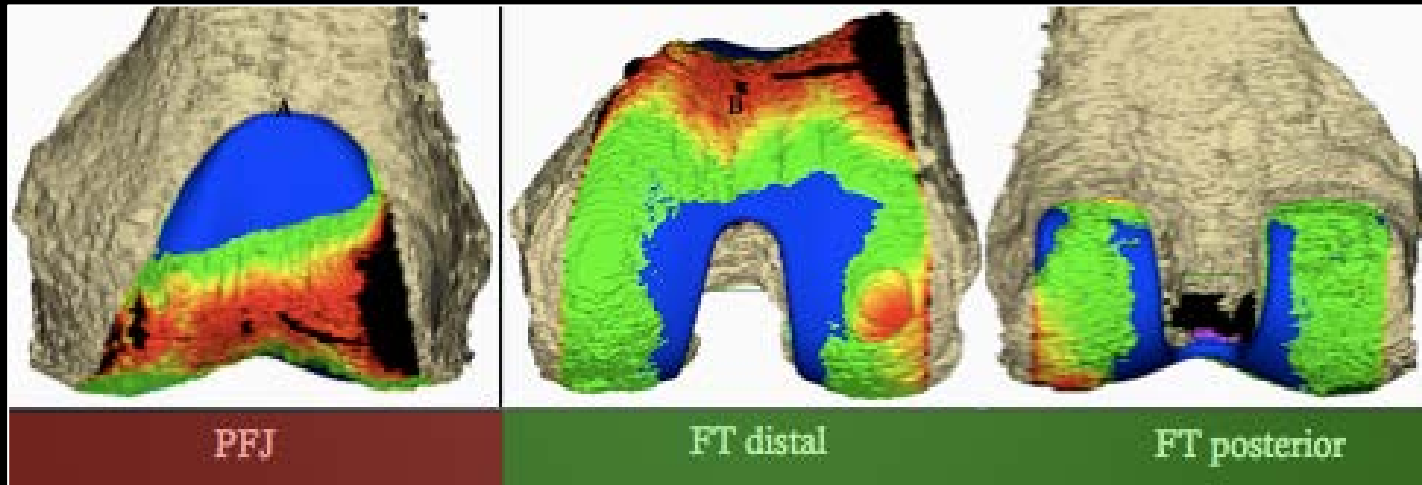
≈ 30% of the patients

post-op HKA

tibial implant positioning



Current TKA design are not appropriate for KA



Key Points

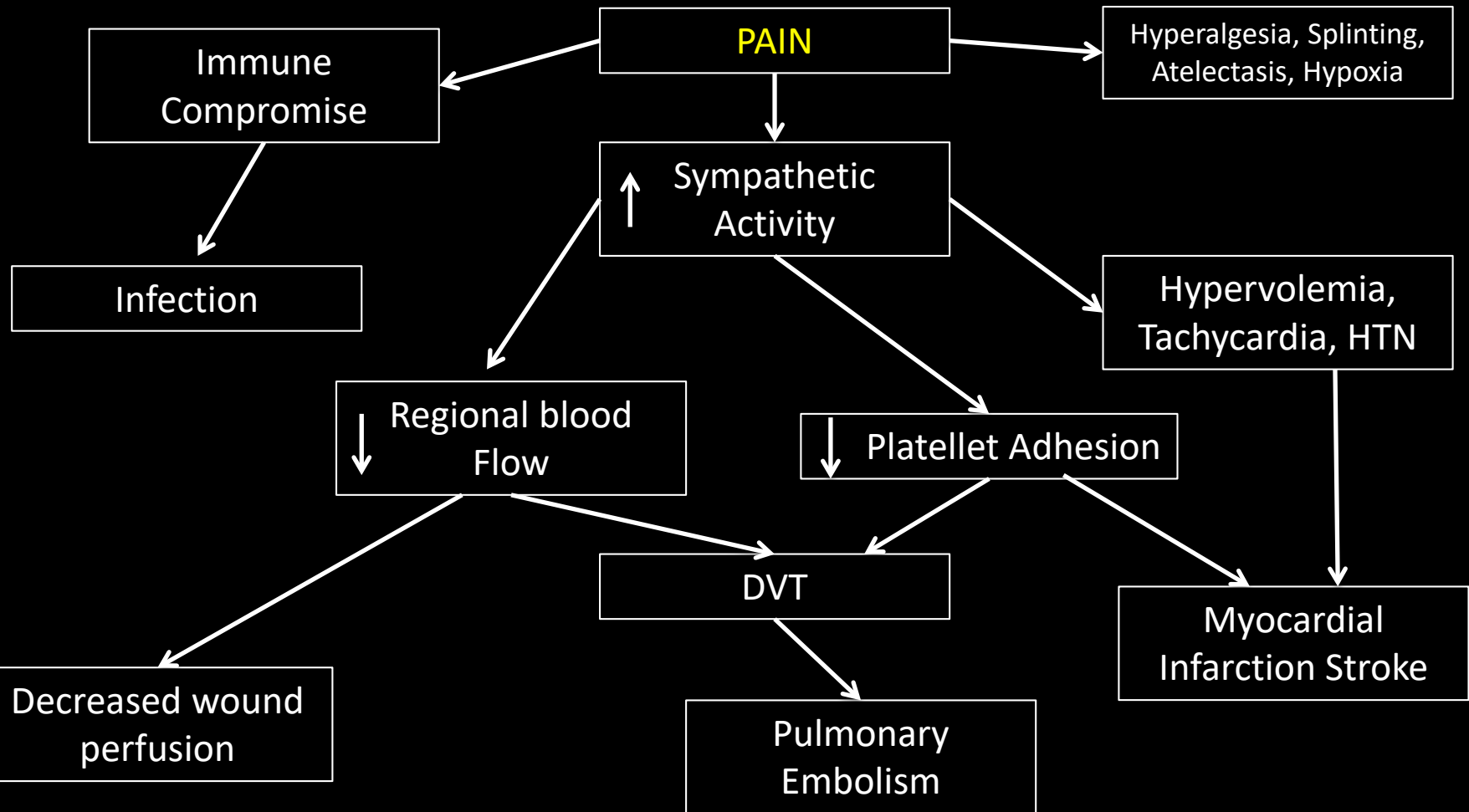
1. Our experience
2. Implants, design and Kinematic
3. Surgical technique
4. Multimodal Pain Management
5. Rehab
6. Patient's role

Joint awareness after total knee arthroplasty is affected by pain and quadriceps strength.

Hiyama Y¹, Wada O², Nakakita S², Mizuno K².

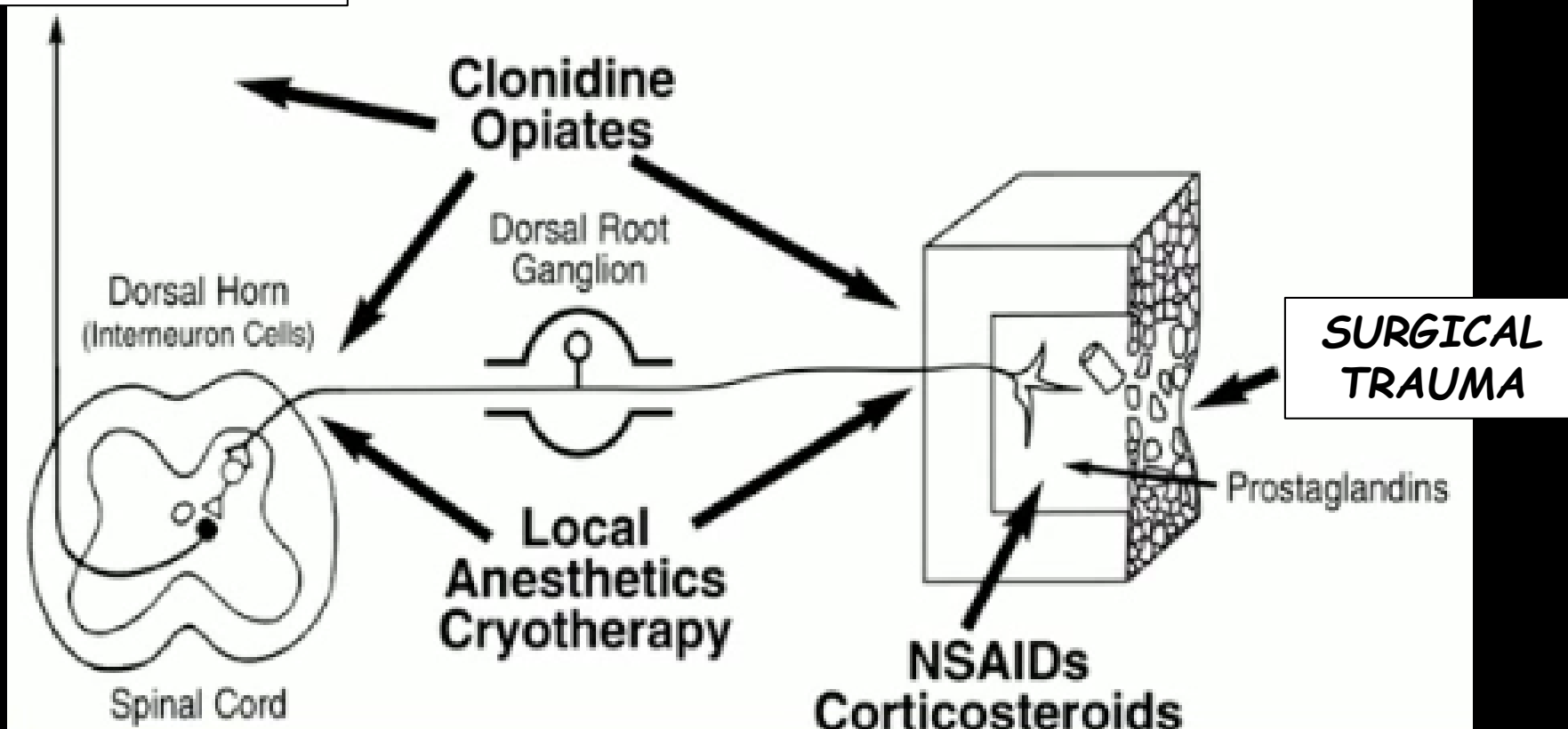
« ... » *FJS was affected most greatly by **pain at 1 month** and by quadriceps strength at 6 and 12 months « ... »*

Harmful Effects of Poorly Controlled Surgical Pain



A multimodal Approach Adresses the Complex Nature of Pain Transmission

**CENTRAL
NERVOUS SYSTEM**



Multimodal Pain Management

- NSAID's (Celebrex)
- Tramadol
- IV Tylenol
- Oxycodone
- Lyrica
- Dexamethasone

- Peripheral nerve blocks


Nerve Blocks : Concerns

Rebound pain :
- unaddressed pain




12% sequela of peripheral nerve blocks
Spangehi and Clark JOA

Contents lists available at [SciVerse ScienceDirect](#)

 **ELSEVIER**

The Knee



Incidence and severity of complications due to femoral nerve blocks performed for knee surgery

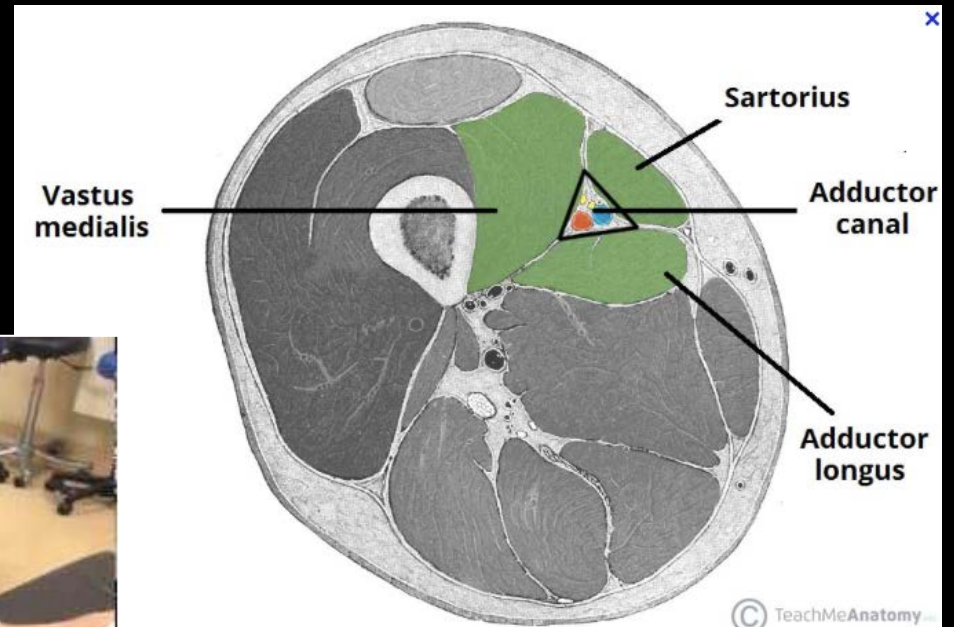
Benjamin Widmer ^a, Sébastien Lustig ^{a,b,*}, Corey J. Scholes ^a, Allen Molloy ^c, Sean P.M. Leo ^{a,d}, Myles R.J. Coolican ^a, David A. Parker ^a

^a Sydney Orthopaedic Research Institute, Chatswood, NSW, Australia
^b Albert Trillat Center, Lyon Nord University Hospital, Lyon, France
^c Anesthesiology, Royal North Shore Hospital, St Leonards, NSW, Australia
^d Singapore Armed Forces, Army Medical Services, Singapore

Adductor Canal Block

10 cm proximal to the patella

5% Bupivacaine 30 cc / US Technique



Peri-articular injections

Different mixtures could be used :

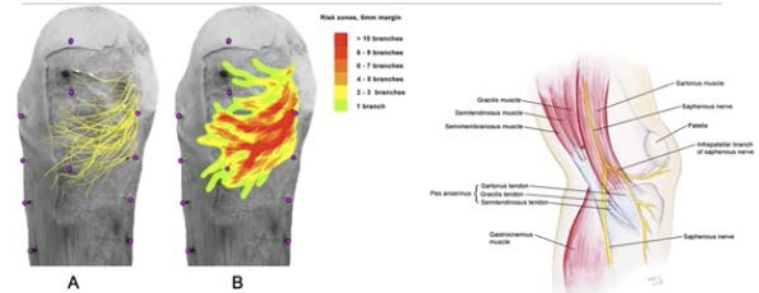
- I. 0.25% Bupivacaine with Epinephrine 30ml + Ketorolac 30mg (1ml) + Morphine 10mg (1ml)
- II. Ropivacaine 180 mg (24mL) + Morphine 5 mg (5mL) + Ketorolac 30 mg (1mL) + 0.9% Normal Saline (30ml)
- III. Ropivacaine 5mg (49.25mL) + Epinephrine 1mg (0.5mL) + Ketorolac 30mg (1mL) + Clonidine 1mg (0.08mg to 0.8mL)



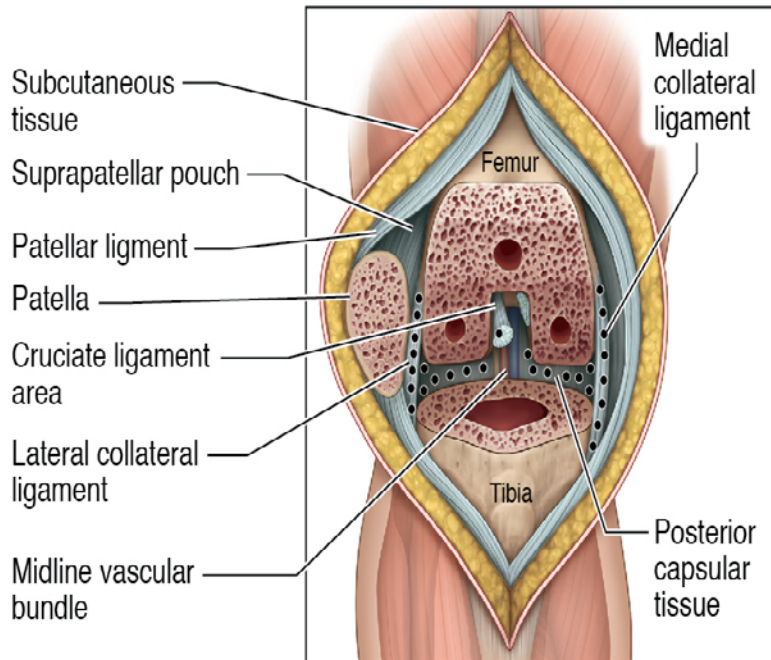
Ropivaine : less cardio toxic
Volume is important

Multiple injections are needed

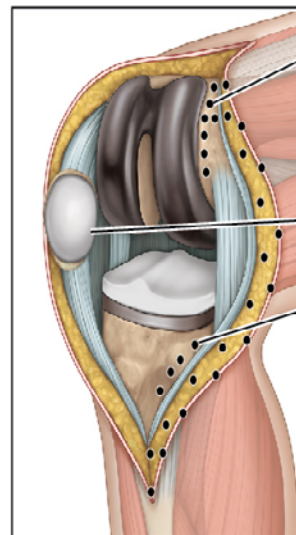
Saphenous Nerve and Branches



Infiltrations before prosthetic placement, right knee (step 1)

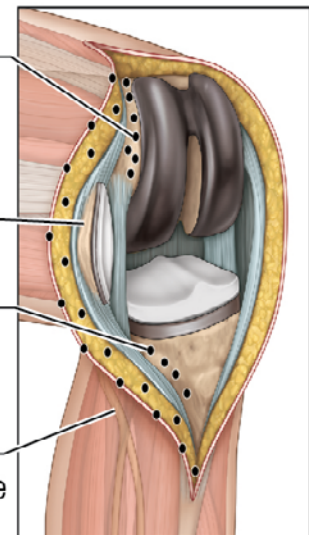


Oblique view of medial infiltrations, (step 2 & 3)



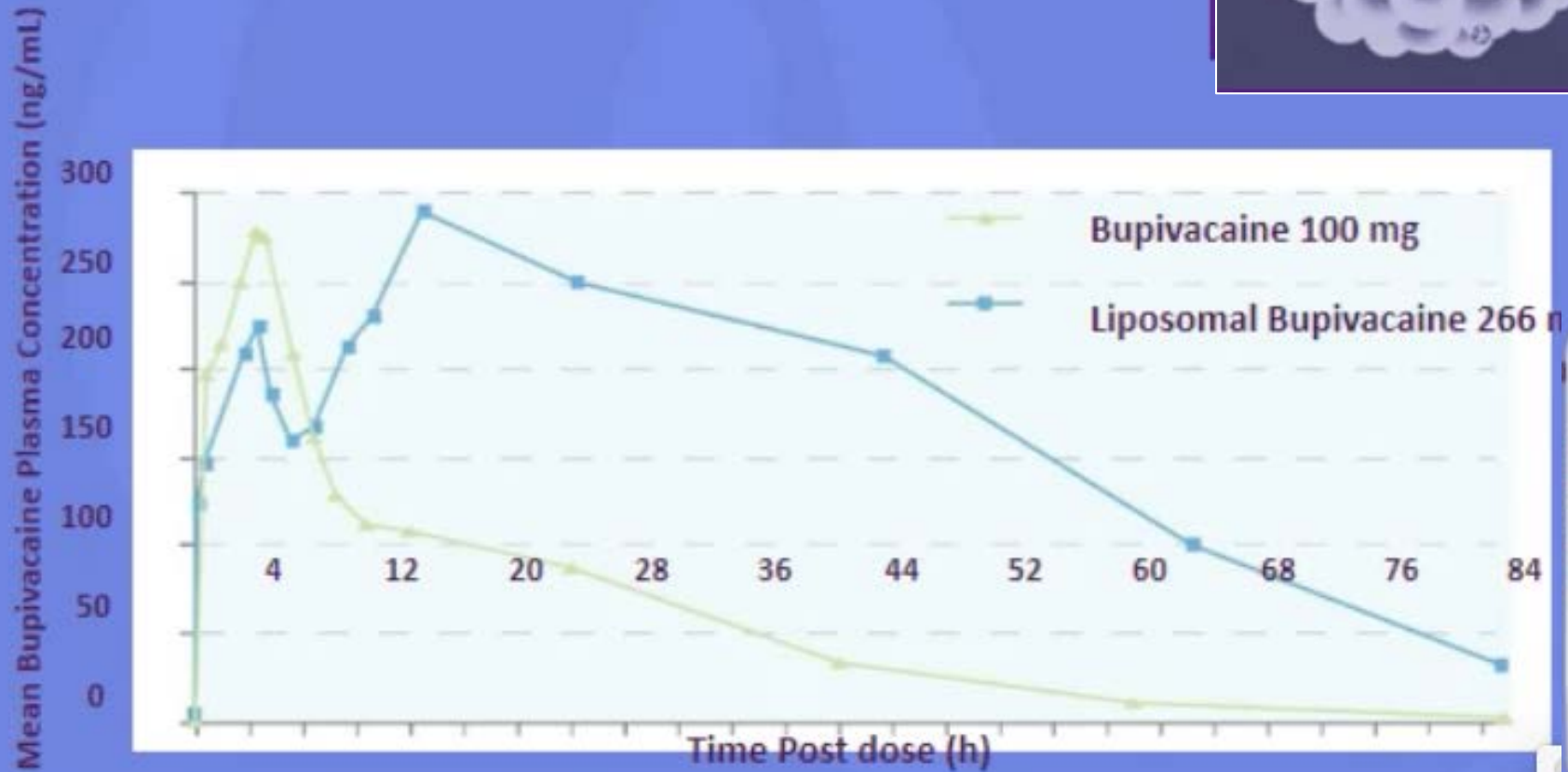
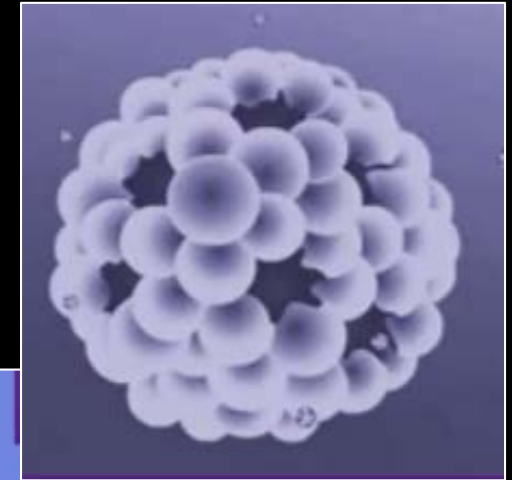
• Infiltration Insertion

Oblique view of lateral infiltrations, (step 2 & 3)



Incision is pictured more wide open than necessary to demonstrate anatomy.

Liposomal Bupivacaine



Key Points

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6. Patient's role

Length of Hospitalization ?

[J Arthroplasty](#). 2016 Aug 9. pii: S0883-5403(16)30448-X. doi: 10.1016/j.arth.2016.07.026. [Epub ahead of print]

Length of Hospitalization After Joint Arthroplasty: Does Early Discharge Affect Complications and Readmission Rates?

Otero JE¹, Gholson JJ¹, Pugely AJ¹, Gao Y¹, Bedard NA¹, Callaghan JJ¹.

[+ Author information](#)

OUTPATIENT SURGERY ?

IMPLICATIONS OF OUTPATIENT VS. INPATIENT TOTAL JOINT ARTHROPLASTY ON HOSPITAL READMISSION RATES

Paper 367, presented at the AAOS 2014 Annual Meeting, March 11-15, 2014, New Orleans, Louisiana.

Authors

David N. Vegari, MD; Jeffrey G. Mokris, MD; Susan M. Odum, PhD; Bryan D. Springer, MD

No statistical difference

Clinical Pathway

The Effect of a Clinical Pathway Strategy for Managing Care in Total Joint Replacement: The Impact on Perioperative Outcomes

Schwarzkopf R^{1*}, Zamansani T², Houng M² and Bridgeman T²

1. Division of Adult Reconstruction, Department of Orthopaedic Surgery, NYU Langone Medical Center Hospital for Joint Diseases, NY, USA
2. University of California Irvine Medical Center, Orange, CA, USA

« ... » guidelines that consider
patient-centered care processes « ... »

Clin Orthop Relat Res (2014) 472:1619–1635

DOI 10.1007/s11999-013-3398-4

Clinical Orthopaedics
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CLINICAL RESEARCH

Developing a Pathway for High-value, Patient-centered Total Joint Arthroplasty

**Aricca D. Van Citters MS, Cheryl Fahlman PhD, Donald A. Goldmann MD,
Jay R. Lieberman MD, Karl M. Koenig MD, MS, Anthony M. DiGioia III MD,
Beth O'Donnell MPH, John Martin MPH, Frank A. Federico RPh,
Richard A. Bankowitz MD, Eugene C. Nelson DSc, MPH, Kevin J. Bozic MD, MBA**

Étapes	Acteur	Actions	Outils	Protocole de référence	A formaliser	Indicateurs
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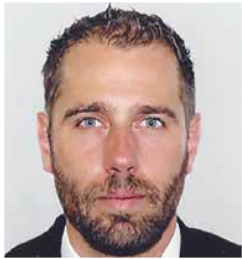
Patient préparé en vue de l'intervention chirurgicale
Confort physique et psychologique-Information adaptée



Étapes	Acteur	Actions	Outils	Protocole de référence	A formaliser	Indicateurs	
J1 HOSPITALISATION	ASD	Installation du patient					
		Présentation équipement de la chambre et du fonctionnement de l'unité	Fiche présentation de l'unité				
	IDE	Validation admission en temps réel	GEMA	Les bonnes pratiques liées au parcours du patient			
		Vérification de tous les éléments portés sur la fiche administrative et validation par une signature					
		Pose du bracelet d'identification du patient		GED- DICS Identification du patient au cours du parcours de soins CF protocole interne pour côté à opérer			
		Entretien d'accueil du patient	DDS				
		Poids, taille et IMC	DDS				
	JO Unité de soins	ASD	Préparation cutanée pré opératoire et vérification du respect de la procédure		Diagramme activités	GED-	
			Pose bas de contention		Diagramme activités	GED-	
			Consigne/ absence bijoux, vêtement, prothèse dentaire/auditive et vérification avant transfert bloc				
IDE		Vérification dossier patient avant départ au bloc					
		Paramètres vitaux (FC, TA, T°, saturation en O2)	DDS				
		Administration prémédication sur prescription médicale	DDS				
		Check list préopératoire					
		Macroscible "Départ au bloc"	DDS				
		Brancardier bloc	IPDP				
		Transfert patient unité de soins- bloc					
ASD	Entretien environnement du patient	Diagramme activités	GED- SSRV SHEP- Bio nettoyage de la chambre				
	Préparation chambre d'opéré		Protocole unité ?				
ASD	IADE	Vérification identité patient					
JO Bloc	IDE	J2 et jusqu'à la veille de la sortie	NFP 2/sem	DDS			
	CHIRURGIEN		Visite et consignes post opératoires				
	INTERNE		Actualisation des prescriptions	DDS			
	IDE		Macroscible "Consigne du tour"	DDS			
			Paramètres vitaux: TA, FC, T°, sat 3/24h	DDS			
			Douleur:				
			· Evaluation par EN 4/24h	DDS			
			Administration:				
			· Traitement antalgique selon protocole	DDS			
			· Prévention des ETEV (Rivaroxaban)	DDS			
JO Post op	IDE	J2 et jusqu'à la veille de la sortie	· traitement personnel selon prescription	DDS			
			Ablation VVP	Diagramme activités			
			Ablation sonde vésicale	Diagramme activités			
			Surveillance locale et risque hématome:3/24h	Diagramme activités			
			Surveillance pansement	Diagramme activités			
	ASD		Alimentation normale	DATAMEAL			
	IDE/ASO		Aide à la toilette sur siège réhaussé	Diagramme activités			
			Surveillance et SPE 3/24h	Diagramme activités			
			Pose et surveillance vessie de glace (site opératoire) 3/24h	Diagramme activités			
	Sortie		IDE	J2 et jusqu'à la veille de la sortie	NFP 2/sem	DDS	
CHIRURGIEN		Visite et consignes post opératoires					
INTERNE		Actualisation des prescriptions	DDS				
IDE		Macroscible "Consigne du tour"	DDS				
		Paramètres vitaux: TA, FC, T°, sat 3/24h	DDS				
		Douleur:					
		· Evaluation par EN 4/24h	DDS				
		Administration:					
		· Traitement antalgique selon protocole	DDS				
		· Prévention des ETEV (Rivaroxaban)	DDS				
Sortie	IDE	J2 et jusqu'à la veille de la sortie	· traitement personnel selon prescription	DDS			
			Ablation VVP	Diagramme activités			
			Ablation sonde vésicale	Diagramme activités			
			Surveillance locale et risque hématome:3/24h	Diagramme activités			
			Surveillance pansement	Diagramme activités			
	ASD		Alimentation normale	DATAMEAL			
	IDE/ASO		Aide à la toilette sur siège réhaussé	Diagramme activités			
			Surveillance et SPE 3/24h	Diagramme activités			
			Pose et surveillance vessie de glace (site opératoire) 3/24h	Diagramme activités			
	Sortie		IDE	J2 et jusqu'à la veille de la sortie	Évaluation risque thrombo embolique		
		Éducation et macroscible "Éducation"	Diagramme activités				
		· auto soins/ plaies chirurgicales	Diagramme activités				
		· auto soins/bas de contention (1 mois)	Diagramme activités				
		Évaluation reprise transit	Diagramme activités				
IDE/MKDE		Levier et mise au fauteuil 3/24h	Diagramme activités				
Kinésithérapeute		Retrait attelle de ZIMMER	Fiche rééducation		Protocole à transmettre		
		Marche et rééducation selon protocole	Fiche rééducation		Protocole à transmettre		
ASD		Entretien de l'environnement du patient	Diagramme activités		GED- SSRV SHEP- Bio nettoyage de la chambre		
Secrétaire médicale		Programme RDV post opératoire à 2 mois	DRDV				
	Édite les ordonnances de sortie sur prescription	GULPER					
	Adresse le CRH au médecin traitant ou SSR	GULPER					
	Édite CRD et CRH pour patient	GULPER					
IDE	Évaluation qualité du sommeil	DDS					
Chirurgien	Visite et consignes post opératoires	DDS					
	Confirme la sortie						
	Signe les ordonnances de sortie ?						
Sortie	Interne	J2 et jusqu'à la veille de la sortie	Réactualise et remet les ordonnances de sortie :				
			· ordonnance Paracétamol pendant 3 semaines	GULPER			
			· ordonnance RIVAXOXAVAN pendant 1mois	GULPER			
			· ordonnance ablation agrafes à J15 par IDE libérale	GULPER			
			· CRH et CRD	GULPER			
	· Prescription arrêt de travail ... mois						

« Digital Health Programs »

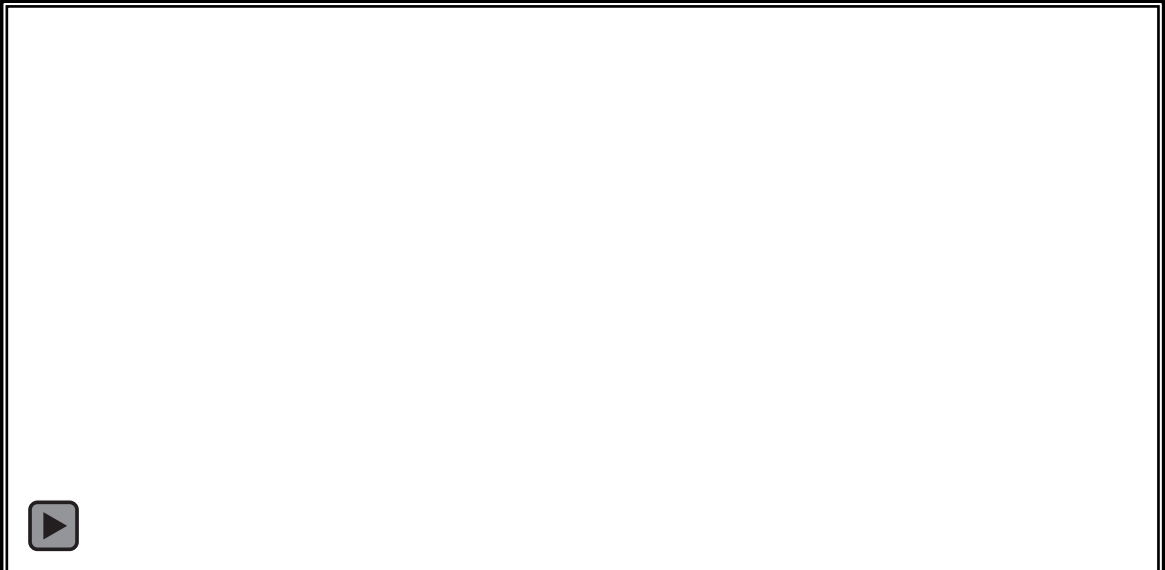
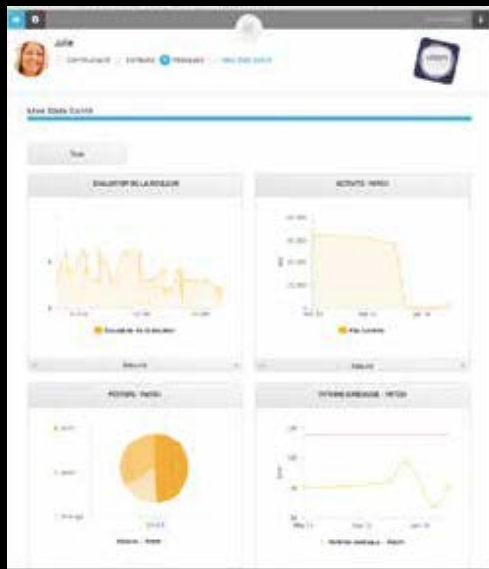
SURGICAL TECHNIQUE



THE CONNECTED PATIENT. ARE WE ABOUT TO ENTER A NEW ERA?

Professor Sébastien LUSTIG

Centre Albert Trillat - Orthopaedic Surgery Department
Croix Rousse Hospital - Lyon



Key Points

1. Our experience
2. Implants, design and Kinematic
3. Surgical technique
4. Multimodal Pain Management
5. Rehab
6. Patient's role

How can we obtain the forgotten knee
?

Rule n°1

Patient selection



Post traumatic, Post infection ...





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THE JOHN INSALL AWARD

Pain and Depression Influence Outcome 5 Years after Knee Replacement Surgery

Victoria Brander, MD; Stephen Gondek, MS; Emily Martin, MS; and S. David Stulberg, MD

Patient : « Bob Booth Criteria »

Women

- > 2 husbands
- Fibromyalgy
- > 2 allergy
- > 2 cats



Men

- With his “mummy”
- Tattoo - to -Tooth Ratio
- Sunglasses indoor
- White shoes in winter
- More than 2 gold chains

Courtesy S Parratte

Take Home message

Forgotten TKA

- Understanding the knee is the key,
- Improvements needed in surgical technique and implant design,
- Perioperative management has a role to play,
- Not yet at reality...



Thank You

sebastien.lustig@gmail.com